

10/518927

DT01 Rec'd PCT/PTC 23 DEC 2004

Sequence listing

<120> DNA sequence and preparation of grass pollen allergen Phl p 4 by
recombinant methods

16-09-2003

PCT/EP U EP0306092

10/518927

DT01 Rec'd PCT/PTO 23 DEC 2004

- 1 -

Sequenz-Protokoll

<110> Merck Patent GmbH

<120> DNA-Sequenz und rekombinante Herstellung des Graspollen-Allergens
Phl p 4

<130> P 02/101

<140> EP 02 013953.1

<141> 2002-06-25

<160> 52

<170> PatentIn version 3.1

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<222> (1)..(69)

<223> DNA sequence derived from sequenced protein

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Ile Gln Ser Ala Val Val Cys Gly Arg Arg His Gly Val Arg Ile Arg	
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Val Arg Ser Gly Gly His Asp Tyr Glu Gly Leu Ser Tyr Arg Ser Leu	
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Gln Pro Glu Glu Phe Ala Val Val Asp Leu Ser Lys Met Arg Ala Val	
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Trp Val Asp Gly Lys Ala Arg Thr Ala Trp Val Asp Ser Gly Ala Gln	
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CORRECTED SHEET (RULE 91) ISA/EP

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Asp Asn Val Lys Pro Ile Tyr Ile Val Thr Pro Thr Asn Ala Ser His
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CORRECTED SHEET (RULE 91) ISA/EP

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Gly Glu Ser Phe Gly Ile Val Val Ala Trp Lys Val Arg Leu Leu Pro
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aaa gaa atc ccg ccg cgt ctg ttg tac gcg aaa tcg tcg ccg gcg tat      96
Lys Glu Ile Pro Pro Arg Leu Leu Tyr Ala Lys Ser Ser Pro Ala Tyr
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ccc tca gtc ctg ggg cag acc atc ccg aac tcg ccg tgg tcg tcg ccg      144
Pro Ser Val Leu Gly Gln Thr Ile Arg Asn Ser Arg Trp Ser Ser Pro
          35          40          45

gac aac gtg aag ccg atc tac atc gtc acc ccc acc aac gcc tcc cac      192
Asp Asn Val Lys Pro Ile Tyr Ile Val Thr Pro Thr Asn Ala Ser His
          50          55          60

atc cag tcc gcc gtg gtg tgc ggc cgc ccg cac ggt gtc cgc atc cgc      240
Ile Gln Ser Ala Val Val Cys Gly Arg Arg His Gly Val Arg Ile Arg
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Val Arg Ser Gly Gly His Asp Tyr Glu Gly Leu Ser Tyr Arg Ser Leu
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cag ccc gag gag ttc gcc gtc gtc gac ctt agc aag atg ccg gcc gtg      336
Gln Pro Glu Glu Phe Ala Val Val Asp Leu Ser Lys Met Arg Ala Val
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tgg gtg gac ggg aag gcc cgc acg gcg tgg gtc gac tcc ggc gcg cag      384
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Leu Gly Glu Leu Tyr Tyr Ala Ile His Lys Ala Ser Pro Val Leu Ala
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Gly Gly Gly Phe Gly Met Leu Leu Arg Lys Tyr Gly Ile Ala Ala Glu
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CORRECTED SHEET (RULE 91) ISA/EP

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 Asp Asn Val Lys Pro Ile Tyr Ile Val Thr Pro Thr Asn Ala Ser His
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CORRECTED SHEET (RULE 91) ISA/EP

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Lys Tyr Phe Lys Gly Asn Phe Glu Arg Leu Ala Ile Thr Lys Gly Lys
  465                      470                      475                      480
gtc gat cct acc gac tac ttc agg aac gag cag agc atc ccg ccg ctc      1488
Val Asp Pro Thr Asp Tyr Phe Arg Asn Glu Gln Ser Ile Pro Pro Leu
                      485                      490                      495
atc aaa aag tac tga      1503
Ile Lys Lys Tyr
      500

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<210> 6

<211> 500

<212> PRT

<213> Phleum pratense

<400> 6

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Tyr Phe Pro Pro Pro Ala Ala Lys Glu Asp Phe Leu Gly Cys Leu Val
  1                      5                      10                      15
Lys Glu Ile Pro Pro Arg Leu Leu Tyr Ala Lys Ser Ser Pro Ala Tyr
                      20                      25                      30
Pro Ser Val Leu Gly Gln Thr Ile Arg Asn Ser Arg Trp Ser Ser Pro
                      35                      40                      45
Asp Asn Val Lys Pro Leu Tyr Ile Ile Thr Pro Thr Asn Val Ser His
                      50                      55                      60
Ile Gln Ser Ala Val Val Cys Gly Arg Arg His Ser Val Arg Ile Arg
  65                      70                      75                      80
Val Arg Ser Gly Gly His Asp Tyr Glu Gly Leu Ser Tyr Arg Ser Leu
                      85                      90                      95
Gln Pro Glu Thr Phe Ala Val Val Asp Leu Asn Lys Met Arg Ala Val
                      100                      105                      110
Trp Val Asp Gly Lys Ala Arg Thr Ala Trp Val Asp Ser Gly Ala Gln
                      115                      120                      125
Leu Gly Glu Leu Tyr Tyr Ala Ile Tyr Lys Ala Ser Pro Thr Leu Ala
  130                      135                      140

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CORRECTED SHEET (RULE 91) ISA/EP

- 15 -

Phe Pro Ala Gly Val Cys Pro Thr Ile Gly Val Gly Gly Asn Phe Ala
 145 150 155 160

Gly Gly Gly Phe Gly Met Leu Leu Arg Lys Tyr Gly Ile Ala Ala Glu
 165 170 175

Asn Val Ile Asp Val Lys Leu Val Asp Ala Asn Gly Lys Leu His Asp
 180 185 190

Lys Lys Ser Met Gly Asp Asp His Phe Trp Ala Val Arg Gly Gly Gly
 195 200 205

Gly Glu Ser Phe Gly Ile Val Val Ala Trp Gln Val Lys Leu Leu Pro
 210 215 220

Val Pro Pro Thr Val Thr Ile Phe Lys Ile Ser Lys Thr Val Ser Glu
 225 230 235 240

Gly Ala Val Asp Ile Ile Asn Lys Trp Gln Val Val Ala Pro Gln Leu
 245 250 255

Pro Ala Asp Leu Met Ile Arg Ile Ile Ala Gln Gly Pro Lys Ala Thr
 260 265 270

Phe Glu Ala Met Tyr Leu Gly Thr Cys Lys Thr Leu Thr Pro Leu Met
 275 280 285

Ser Ser Lys Phe Pro Glu Leu Gly Met Asn Pro Ser His Cys Asn Glu
 290 295 300

Met Ser Trp Ile Gln Ser Ile Pro Phe Val His Leu Gly His Arg Asp
 305 310 315 320

Ala Leu Glu Asp Asp Leu Leu Asn Arg Asn Asn Ser Phe Lys Pro Phe
 325 330 335

Ala Glu Tyr Lys Ser Asp Tyr Val Tyr Gln Pro Phe Pro Lys Thr Val
 340 345 350

Trp Glu Gln Ile Leu Asn Thr Trp Leu Val Lys Pro Gly Ala Gly Ile
 355 360 365

Met Ile Phe Asp Pro Tyr Gly Ala Thr Ile Ser Ala Thr Pro Glu Ser
 370 375 380

CORRECTED SHEET (RULE 91) ISA/EP

- 16 -

Ala Thr Pro Phe Pro His Arg Lys Gly Val Leu Phe Asn Ile Gln Tyr
385 390 395 400

Val Asn Tyr Trp Phe Ala Pro Gly Ala Ala Ala Pro Leu Ser Trp
405 410 415

Ser Lys Asp Ile Tyr Asn Tyr Met Glu Pro Tyr Val Ser Lys Asn Pro
420 425 430

Arg Gln Ala Tyr Ala Asn Tyr Arg Asp Ile Asp Leu Gly Arg Asn Glu
435 440 445

Val Val Asn Asp Val Ser Thr Tyr Ala Ser Gly Lys Val Trp Gly Gln
450 455 460

Lys Tyr Phe Lys Gly Asn Phe Glu Arg Leu Ala Ile Thr Lys Gly Lys
465 470 475 480

Val Asp Pro Thr Asp Tyr Phe Arg Asn Glu Gln Ser Ile Pro Pro Leu
485 490 495

Ile Lys Lys Tyr
500

<210> 7

<211> 10

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (6)..(6)

<223> undetermined amino acid

<400> 7

Ile Val Ala Leu Pro Xaa Gly Met Leu Lys
1 5 10

<210> 8

<211> 14

- 17 -

<212> PRT

<213> Lolium perenne

<400> 8

Phe	Leu	Glu	Pro	Val	Leu	Gly	Leu	Ile	Phe	Pro	Ala	Gly	Val
1				5					10				

<210> 9

<211> 9

<212> PRT

<213> Lolium perenne

<400> 9

Gly	Leu	Ile	Glu	Phe	Pro	Ala	Gly	Val
1				5				

<210> 10

<211> 12

<212> PRT

<213> Dactylus glomerata

<400> 10

Asp	Ile	Tyr	Asn	Tyr	Met	Glu	Pro	Tyr	Val	Ser	Lys
1				5					10		

<210> 11

<211> 11

<212> PRT

<213> Dactylus glomerata

<400> 11

Val	Asp	Pro	Thr	Asp	Tyr	Phe	Gly	Asn	Glu	Gln
1				5					10	

<210> 12

- 18 -

<211> 17

<212> PRT

<213> Dactylus glomerata

<400> 12

Ala	Arg	Thr	Ala	Trp	Val	Asp	Ser	Gly	Ala	Gln	Leu	Gly	Glu	Leu	Ser
1				5					10					15	

Tyr

<210> 13

<211> 15

<212> PRT

<213> Dactylus glomerata

<400> 13

Gly	Val	Leu	Phe	Asn	Ile	Gln	Tyr	Val	Asn	Tyr	Trp	Phe	Ala	Pro
1				5					10					15

<210> 14

<211> 11

<212> PRT

<213> Cynodon dactylon

<400> 14

Lys	Thr	Val	Lys	Pro	Leu	Tyr	Ile	Ile	Thr	Pro
1				5					10	

<210> 15

<211> 22

<212> PRT

<213> Cynodon dactylon

<400> 15

- 19 -

Lys Gln Val Glu Arg Asp Phe Leu Thr Ser Leu Thr Lys Asp Ile Pro
 1 5 10 15

Gln Leu Tyr Leu Lys Ser
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<210> 16

<211> 16

<212> PRT

<213> Cynodon dactylon

<400> 16

Thr Val Lys Pro Leu Tyr Ile Ile Thr Pro Ile Thr Ala Ala Met Ile
 1 5 10 15

<210> 17

<211> 24

<212> PRT

<213> Cynodon dactylon

<400> 17

Leu Arg Lys Tyr Gly Thr Ala Ala Asp Asn Val Ile Asp Ala Lys Val
 1 5 10 15

Val Asp Ala Gln Gly Arg Leu Leu
 20

<210> 18

<211> 14

<212> PRT

<213> Cynodon dactylon

<400> 18

Lys Trp Gln Thr Val Ala Pro Ala Leu Pro Asp Pro Asn Met
 1 5 10

<210> 19

- 20 -

<211> 15

<212> PRT

<213> Cynodon dactylon

<400> 19

Val	Thr	Trp	Ile	Glu	Ser	Val	Pro	Tyr	Ile	Pro	Met	Gly	Asp	Lys
1				5					10					15

<210> 20

<211> 19

<212> PRT

<213> Cynodon dactylon

<220>

<221> MISC_FEATURE

<222> (8)..(8)

<223> undetermined amino acid

<400> 20

Gly	Thr	Val	Arg	Gln	Leu	Leu	Xaa	Arg	Thr	Ser	Asn	Ile	Lys	Ala	Phe
1				5					10					15	

Gly Lys Tyr

<210> 21

<211> 23

<212> PRT

<213> Cynodon dactylon

<400> 21

Thr	Ser	Asn	Ile	Lys	Ala	Phe	Gly	Lys	Tyr	Lys	Ser	Asp	Tyr	Val	Leu
1				5					10					15	

Glu	Pro	Ile	Pro	Lys	Lys	Ser
			20			

- 21 -

<210> 22

<211> 13

<212> PRT

<213> Cynodon dactylon

<400> 22

Tyr Arg Asp Leu Asp Leu Gly Val Asn Gln Val Val Gly
 1 5 10

<210> 23

<211> 15

<212> PRT

<213> Cynodon dactylon

<400> 23

Ser Ala Thr Pro Pro Thr His Arg Ser Gly Val Leu Phe Asn Ile
 1 5 10 15

<210> 24

<211> 36

<212> PRT

<213> Cynodon dactylon

<400> 24

Ala Ala Ala Ala Leu Pro Thr Gln Val Thr Arg Asp Ile Tyr Ala Phe
 1 5 10 15

Met Thr Pro Tyr Val Ser Lys Asn Pro Arg Gln Ala Tyr Val Asn Tyr
 20 25 30

Arg Asp Leu Asp
 35

<210> 25

<211> 149

- 22 -

<212> DNA

<213> Phleum pratense

<400> 25
 caccggaagg ggggtgctgtt caacatccag tacgtcaact actggttcgc cccgggagcc 60
 ggcgcggcgc cattgtcgtg gagcaaggag atctacaact acatggagcc gtacgtgagc 120
 aaggaccccg tccaggccta cgccaacta 149

<210> 26

<211> 299

<212> DNA

<213> Phleum pratense

<400> 26
 actactggtt cgccccggga gccggcgcgg cgccattgtc gtggagcaag gagatctaca 60
 actacatgga gccatacgtg agcaagaacc ccaggcaggc ctacgccaac tacagggaca 120
 tcgacctcgg gaggaacgag gtggtgaacg acgtctccac cttcagcagc ggtttggtgt 180
 ggggccagaa atacttcaag ggcaacttcc agaggctcgc catcaccaag ggcaagggtg 240
 atcccaccga ctacttcagg aacgagcaga gcatcccgcc gctcatcaaa aagtactga 299

<210> 27

<211> 33

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (14)..(14)

<223> undetermined amino acid

<400> 27

Tyr Phe Pro Pro Pro Ala Ala Lys Glu Asp Phe Leu Gly Xaa Leu Val
 1 5 10 15

- 23 -

Lys Glu Ile Pro Pro Arg Leu Leu Tyr Ala Lys Ser Ser Pro Ala Tyr
 20 25 30

Pro

<210> 28

<211> 18

<212> PRT

<213> Phleum pratense

<220>

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<222> (6)..(6)

<223> undetermined amino acid

<400> 28

Ser Ala Thr Pro Phe Xaa His Arg Lys Gly Val Leu Phe Asn Ile Gln
 1 5 10 15

Tyr Val

<210> 29

<211> 10

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (3)..(8)

<223> undetermined amino acid

<400> 29

Gly Leu Xaa Tyr Arg Xaa Leu Xaa Pro Glu
 1 5 10

- 24 -

<210> 30
<211> 12
<212> PRT
<213> Phleum pratense

<220>
<221> MISC_FEATURE
<222> (2)..(9)
<223> undetermined amino acid

<400> 30
Lys Xaa Met Gly Asp Asp His Phe Xaa Ala Val Arg
1 5 10

<210> 31
<211> 9
<212> PRT
<213> Phleum pratense

<400> 31
Ala Pro Glu Gly Ala Val Asp Ile Ile
1 5

<210> 32
<211> 16
<212> PRT
<213> Phleum pratense

<400> 32
Met Glu Pro Tyr Val Ser Ile Asn Pro Val Gln Ala Tyr Ala Asn Tyr
1 5 10 15

<210> 33

- 25 -

<211> 15

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (14)..(14)

<223> undetermined amino acid

<400> 33

Tyr	Phe	Pro	Pro	Pro	Ala	Ala	Lys	Glu	Asp	Phe	Leu	Gly	Xaa	Leu
1				5					10					15

<210> 34

<211> 10

<212> PRT

<213> Phleum pratense

<400> 34

Leu	Tyr	Ala	Lys	Ser	Ser	Pro	Ala	Tyr	Pro
1				5					10

<210> 35

<211> 33

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (14)..(14)

<223> undetermined amino acid

<400> 35

- 26 -

Tyr Phe Pro Pro Pro Ala Ala Lys Glu Asp Phe Leu Gly Xaa Leu Val
1 5 10 15

Lys Glu Ile Pro Pro Arg Leu Leu Tyr Ala Lys Ser Ser Pro Ala Tyr
20 25 30

Pro

<210> 36

<211> 29

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (14)..(14)

<223> undetermined amino acid

<400> 36

Tyr Phe Pro Pro Pro Ala Ala Lys Glu Asp Phe Leu Gly Xaa Leu Val
1 5 10 15

Lys Glu Pro Pro Arg Leu Leu Tyr Ala Lys Ser Ser Pro
20 25

<210> 37

<211> 15

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (4)..(14)

<223> undetermined amino acid

- 27 -

<400> 37

Tyr	Phe	Pro	Xaa	Xaa	Ala	Ala	Lys	Glu	Asp	Phe	Leu	Gly	Xaa	Leu
1				5					10					15

<210> 38

<211> 15

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (4)..(14)

<223> undetermined amino acid

<400> 38

Tyr	Phe	Pro	Xaa	Xaa	Ala	Lys	Lys	Glu	Asp	Phe	Leu	Gly	Xaa	Leu
1				5					10					15

<210> 39

<211> 15

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (4)..(14)

<223> undetermined amino acid

<400> 39

Tyr	Phe	Pro	Xaa	Xaa	Ala	Ala	Lys	Asp	Asp	Phe	Leu	Gly	Xaa	Leu
1				5					10					15

<210> 40

<211> 11

- 28 -

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (4)..(5)

<223> undetermined amino acid

<400> 40

Tyr Phe Pro Xaa Xaa Leu Ala Asn Glu Asp Phe
1 5 10

<210> 41

<211> 18

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (6)..(6)

<223> undetermined amino acid

<400> 41

Ser Ala Thr Pro Phe Xaa His Arg Lys Gly Val Leu Phe Asn Ile Gln
1 5 10 15

Tyr Val

<210> 42

<211> 10

<212> PRT

<213> Phleum pratense

- 29 -

<220>

<221> MISC_FEATURE

<222> (3)..(8)

<223> undetermined amino acid

<400> 42

Gly Leu Xaa Tyr Arg Xaa Leu Xaa Pro Glu
1 5 10

<210> 43

<211> 12

<212> PRT

<213> Phleum pratense

<220>

<221> MISC_FEATURE

<222> (2)..(9)

<223> undetermined amino acid

<400> 43

Lys Xaa Met Gly Asp Asp His Phe Xaa Ala Val Arg
1 5 10

<210> 44

<211> 9

<212> PRT

<213> Phleum pratense.

<400> 44

Ala Pro Glu Gly Ala Val Asp Ile Ile
1 5

<210> 45

<211> 16

- 30 -

<212> PRT

<213> Phleum pratense

<400> 45

Met Glu Pro Tyr Val Ser Ile Asn Pro Val Gln Ala Tyr Ala Asn Tyr
1 5 10 15

<210> 46

<211> 29

<212> DNA

<213> Phleum pratense

<220>

<221> misc_feature

<222> (1)..(29)

<223> 'n' means inosin

<400> 46

ytn taygcna arwsnwsncc ngcntaycc

29

<210> 47

<211> 28

<212> DNA

<213> Phleum pratense

<220>

<221> misc_feature

<222> (1)..(28)

<223> 'n' means inosin

<400> 47

caymgnaarg gngtnytntt yaayatmc

28

<210> 48

- 31 -

<211> 26

<212> DNA

<213> Phleum pratense

<220>

<221> misc_feature

<222> (1)..(26)

<223> 'n' means inosin

<400> 48

tarttngcrt angcytgnac nggrtt

26

<210> 49

<211> 23

<212> DNA

<213> Phleum pratense

<400> 49

actactgggt cgccccggga gcc

23

<210> 50

<211> 28

<212> DNA

<213> Phleum pratense

<400> 50

tgaagtattt ctggccccac accaaacc

28

<210> 51

<211> 24

<212> DNA

<213> Phleum pratense

<400> 51

cccttggtga tggcgagcct ctgg

24

16-09-2003

PCT/EP 03 EP0306092

- 32 -

<210> 52

<211> 23

<212> DNA

<213> Phleum pratense

<400> 52
ctcagtcctg gggcagacca tcc

23

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